

# **Achieving Better Buying Power through Acquisition of Open Architecture Software Systems for Web-Based and Mobile Devices**

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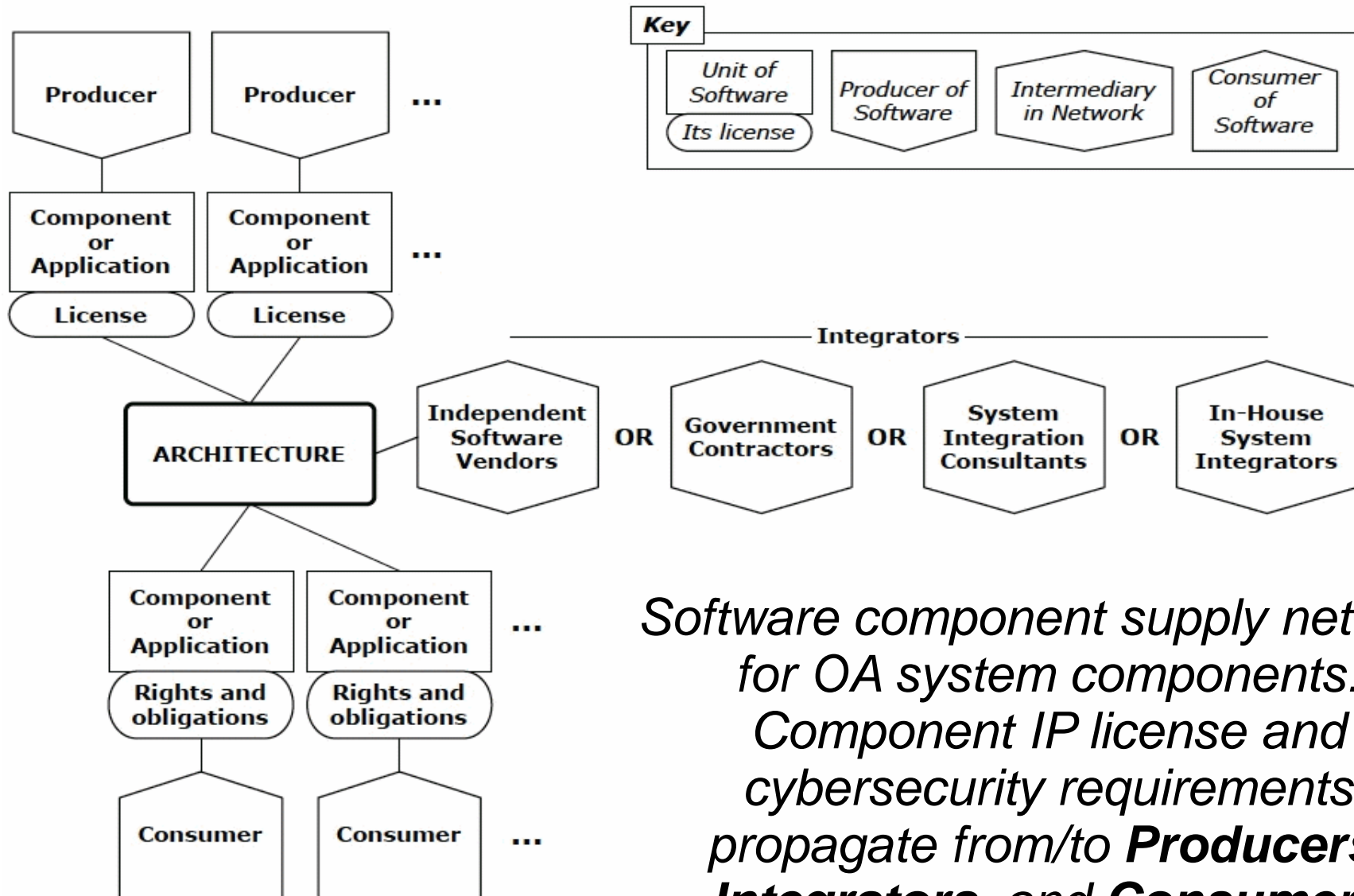
# Overview

- Recent trends in open architecture (OA) software systems
- Emerging challenges in achieving *Better Buying Power* (BBP) via OA software systems for Web-based and Mobile devices
- New practices to realize cost-effective acquisition of OA software systems
- Conclusions

# Recent trends in OA software systems

- Multi-party acquisition and OA development ecosystems
- Shared development of Apps and Widgets as OA system components and capabilities
- Growing diversity of challenges in cybersecurity
- New business models for OA software component development and use

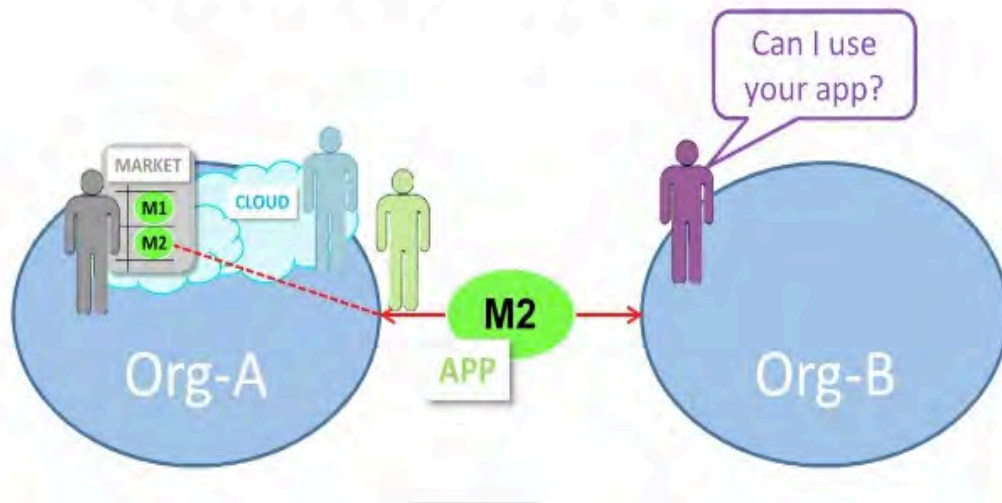
# Multi-party acquisition and OA development ecosystems



*Software component supply network for OA system components: Component IP license and cybersecurity requirements propagate from/to **Producers**, **Integrators**, and **Consumers***

# Multi-party acquisition of *assembled capabilities* within OA development ecosystems

## Mobile Reciprocity



## Multi-Party Interactions



Consumer/End-User Organizations seeking ways to reduce acquisition cost and effort through shared development/use of common OA software system components (proprietary/open source Apps, Widgets).



# Shared development of Web-based Apps and Widgets as OA system components

Desktop Window Manager - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Desktop Window Manager

W raven-s-6576 https://raven-s-6576/owf/#guid=92b15a46-12eb-40b2-8bfa-feab943cb3c3

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Widget Framework

Tabbed Window Manager | Accordion Window Manager | Desktop Window Manager | Portal Window Manager

Welcome Test User 1 | Logout | Hide

Launch Menu | Share | Customize | Eventing |

**Mission Status**

**Applications**

- Collaboration 11
- COP 7
- DGGS 7
- E-mail 5
- Messaging 7
- Web 9

**Data Network Services**

- CENTRIXS 7
- Internet 11
- NIPRNET 7
- SI COMMS 9
- SIPRNET 9
- TADILS 7

**Video Network Services**

- JWICS 4
- VIXS 7
- VOIP (Video) 7
- VTC DVS-G 1

**Voice Network Services**

- DRSN 9
- DSN 5

**Raven Hosts Viewer**

Raven Network Assets

Show All Raven Assets

**Raven Assets**

State	Host Name	IP
●	10.2.0.15	10.2.0.15
●	10.2.0.31	10.2.0.31
●	10.2.0.77	10.2.0.77
●	10.2.0.78	10.2.0.78
●	10.2.0.81	10.2.0.81
●	10.2.0.86	10.2.0.86
●	10.2.0.87	10.2.0.87
●	10.2.0.89	10.2.0.89
●	10.2.0.92	10.2.0.92
●	10.2.0.95	10.2.0.95
●	BILL-LAP.prowan.net	10.2.0.57
●	FTPNI.prowan.net	10.2.0.254
●	NI-BDC.prowan.net	10.2.0.27
●	NI-FAX.prowan.net	10.2.0.4
●	NI-FILES.prowan.net	10.2.0.3
●	NI-VPN-220.prowan.net	10.2.0.220
●	NI-VPN-221.prowan.net	10.2.0.221
●	NI-VPN-222.prowan.net	10.2.0.222

**BMC Remedy Trouble Ticket**

bmcsoftware

**Remedy Trouble Ticket**

Creator

Title

Description

Cross reference

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9:40 AM 3/1/2012

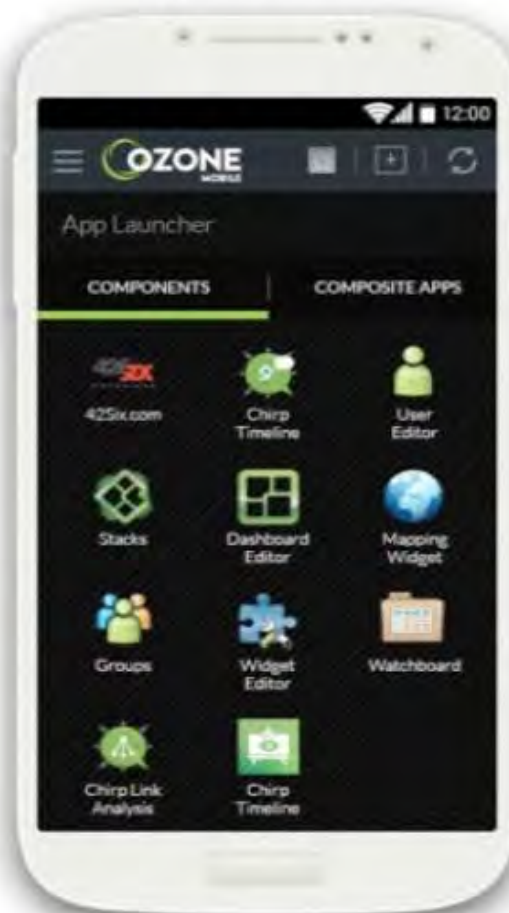
*Widget Framework for Web-based PCs*

# Shared development of Mobile Apps and Widgets as OA system components

CAS Sign In



App Launcher



Ozone Mobile Drawer Menu



*Ozone Widget Framework for Mobile Devices*



# Assemble capabilities using Apps/Widgets from trusted parties via sharing agreements

The screenshot displays the GEOINT App Store interface. At the top, there's a header with the GEOINT App Store logo, navigation links for 'Sign Up' and 'Sign In', and a search bar. Below the header, a dark blue navigation bar contains 'GEOINT App Store Home' and 'About'.

**Featured Section:**

- Submit Ideas** (1)
- New Apps!** (3)
- First Responder Apps** (3)
- Mariner Apps** (3)
- Aviator Apps** (2)

**Nepal Disaster Response** (8)

**Submit App Idea**  
45 Views  
7 Launches  
★★★★★

**Refine by**

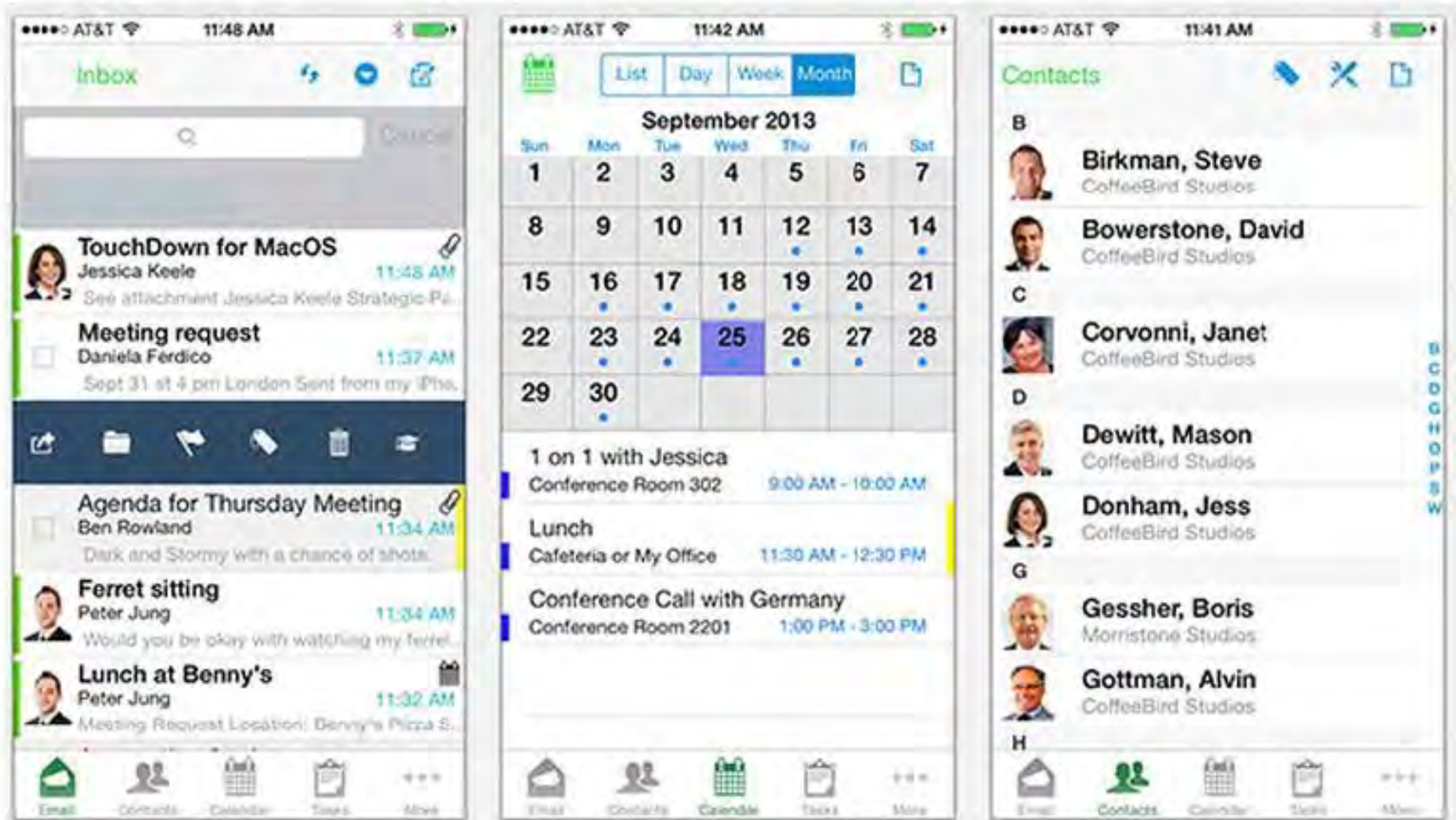
- Product Type**
  - ☐ Android Application (7)
  - ☐ Idea (11)
  - ☐ iOS Application (4)
  - ☐ Web Application (17)
  - ☐ Web Service (8)
- Agency**
  - ☐ Dept of Defense (1)
  - ☐ DigitalGlobe (1)
  - ☐ DOI (1)
  - ☐ NASA (1)
  - ☐ NGA (16)
  - [+ choose more](#)
- Category**
  - ☐ Analysis (1)
  - ☐ Collaboration (6)
  - ☐ Collection (2)

**All** Sort By ▼

App Icon	App Name	Views	Launches	Rating
	USMC NAWCWD ...	1076 Views		★★★★★
	R3 Active Events ...	788 Views	78 Launches	★★★★★
	MSP GeoTrans	1224 Views	44 Downloads	★★★★★
	GEOINT App Stor...	339 Views	62 Launches	★★★★★
	GEOINT App Stor...	274 Views	25 Launches	★★★★★
	EOSDIS Worldview	796 Views	87 Launches	★★★★★
	Avenza PDF Maps	904 Views		★★★★★
	Disaster Atlas	749 Views	73 Launches	★★★★★
	NGA POD	1299 Views	32 Launches	★★★★★

Widgets available within *App Store*

# Commercial Mobile Apps also being used (enterprise middleware services, not shown)



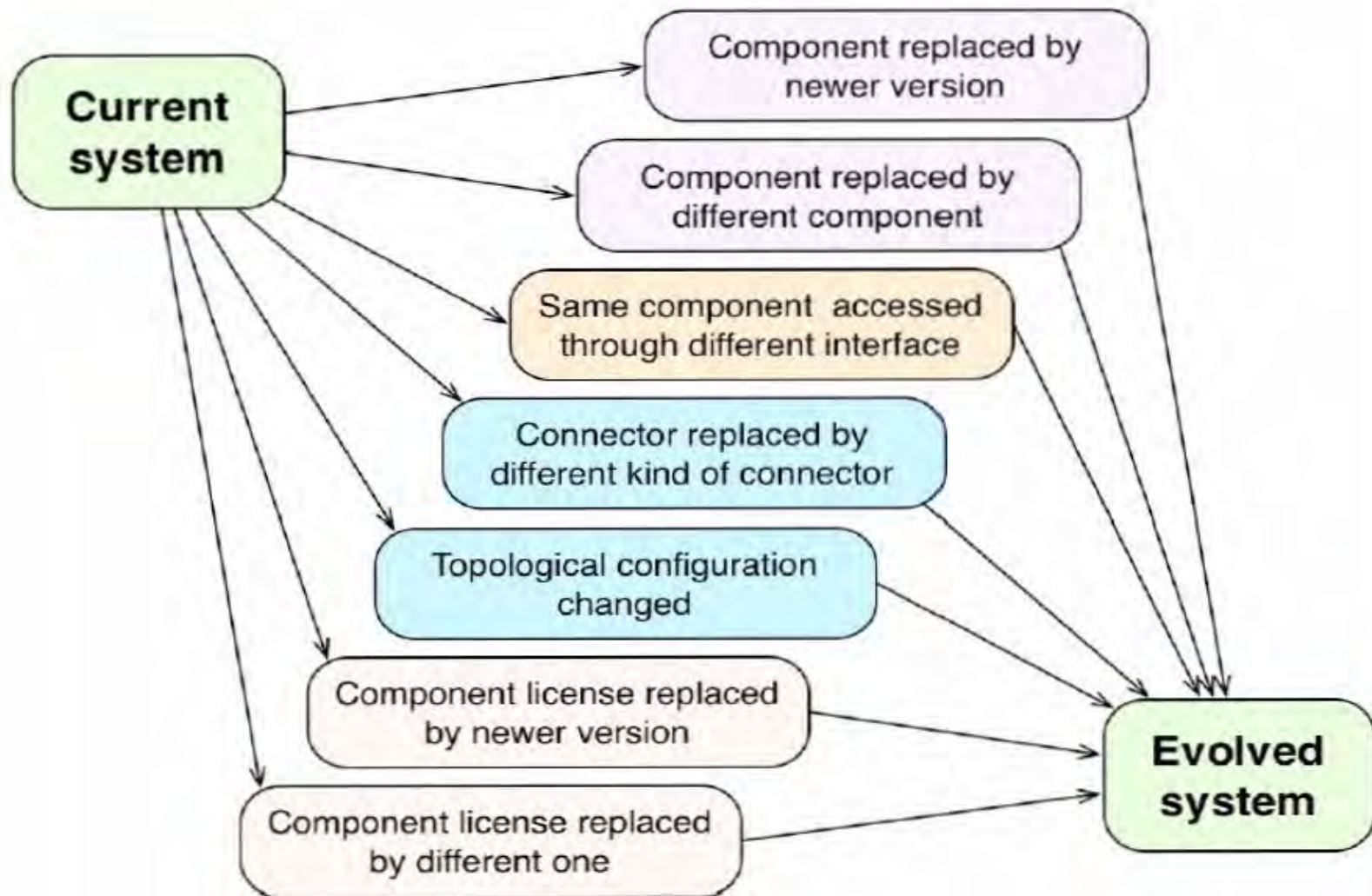
# Enterprise-to-Mobile Middleware *IP Licenses*

(for the NitroDesk *Touchdown* product)

- \* LGPL 2.1
- \* Ical4j from Ben Fortuna
- \* Public Domain Declaration
- \* Apache 2
- \* The Legion of the Bouncy Castle
- \* Creative Commons BY
- \* Sony Mobile
- \* Jesse Anderson
- \* OpenSSL
- \* Apple Non-Exclusive
- \* SQLite
- \* Microsoft Public License



# Multi-party acquisition and OA development ecosystems: *Multiple OA system evolution paths*



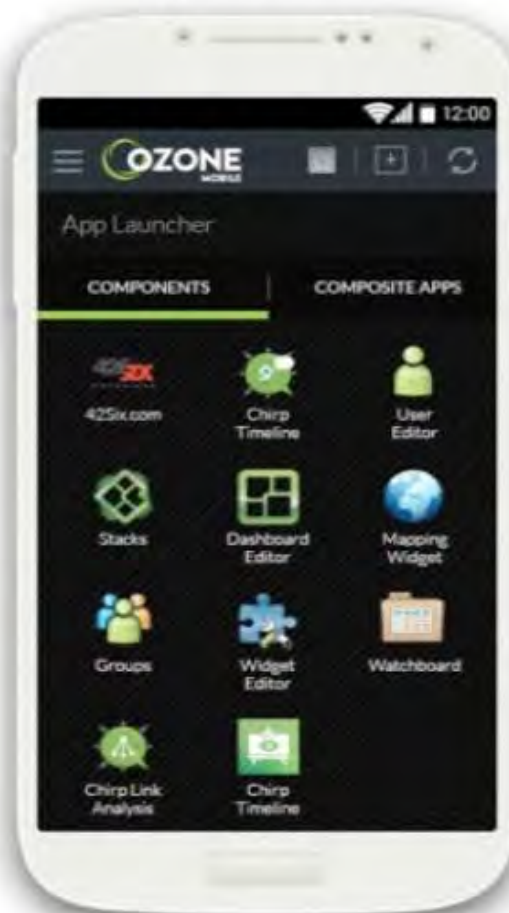
IP and cybersecurity requirements will need *continuous attention!*

# Shared development of Apps and Widgets as OA system components: *Cybersecurity?*

CAS Sign In



App Launcher



Ozone Mobile Drawer Menu



Ozone Widgets supporting “*Bring Your Own Devices*” (BYOD)?



# Growing diversity of challenges in cybersecurity

- Scacchi, W. and Alspaugh, T. (2012) Addressing Challenges in the Acquisition of Secure Software Systems with Open Architectures, *Proc. 9th Acquisition Research Symposium*, Vol. 1, 165-184, Naval Postgraduate School, Monterey, CA.
- Scacchi, W. and Alspaugh, T. (2013a). Processes in Securing Open Architecture Software Systems, *Proc. 2013 Intern. Conf. Software and System Processes*, San Francisco, CA, May 2013.
- Scacchi, W. and Alspaugh, T.A. (2013b). Streamlining the Process of Acquiring Secure Open Architecture Software Systems, *Proc. 10th Annual Acquisition Research Symposium*, Monterey, CA, 608-623, May 2013.
- Scacchi, W. and Alspaugh, T.A. (2013c). Challenges in the Development and Evolution of Secure Open Architecture Command and Control Systems, *Proc. 18th Intern. Command and Control Research and Technology Symposium*, Paper-098, Alexandria, VA, June 2013.

# New business models for acquisition of OA Web/mobile software components

- Franchising
- Enterprise licensing
- Metered usage
- Advertising supported
- Subscription
- Free component, paid service fees
- Federated reciprocity for shared development
- Collaborative buying
- Donation
- Sponsorship
- (Government) open source software
- and others

# Emerging challenges in achieving BBP via OA Web/mobile software systems

- Acquisition program managers/staff *may not understand* how software IP licenses affect OA system design, and vice-versa.
- Software IP and cybersecurity obligations and rights propagate across system development, deployment, and evolution activities *in ways not well understood* by system developers, integrators, end-users, or acquisition managers.

# Emerging challenges in achieving BBP via OA Web/mobile software systems

- *Failure to understand* software IP and cybersecurity obligations and rights propagation can reduce DoD buying power, increase software life cycle costs, and reduce competition.
- DoD and other Government agencies *would financially and administratively benefit* from engaging the development and deployment of an (open source) automated *software obligations and rights management system* (SORMS) for the acquisition workforce.

# New practices to realize cost-effective acquisition of OA software systems

- Need to R&D ***worked examples*** of reference OA system models, assembled capabilities, and component evolution alternatives.
- Need ***open source models of*** app/widget security assurance ***processes and*** reusable cybersecurity ***requirements.***



# New practices to realize cost-effective acquisition of OA software systems

- Need precise ***domain-specific languages*** (DSLs) and ***automated analysis tools*** for continuously assessing and continuously improving cybersecurity and IP requirements for OA C2 systems composed from apps/widgets.
  - Need a *software obligations and rights management system* (SORMS) to streamline Web/mobile software component acquisition

# Conclusions

- Our research identifies how new Web/mobile software component technologies, IP and security requirements, and new business models interact to *drive-down or drive-up* acquisition costs.
- Managing acquisition costs for OA Web/mobile software components will be demanding.
- Acquisition workforce will need automated assistance, *else acquisition process costs will dominate development costs* for OA Web/mobile software components!

# Conclusions

- New technical risks for component-based OA software systems can dilute the cost-effectiveness of BBP efforts.
- Need R&D leading to automated systems (SORMS) that can model and analyze OA system IP licenses and cybersecurity requirements
  - SORMS will empower the acquisition workforce, and
  - Identify and manage cost-effectiveness trade-offs

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